

Remarks/Arguments:

Applicant, again, wishes to thank Examiners Mark Kopec and Kallambella Vijayakumar for the courteous consideration rendered applicant's representative during an interview conducted at the Patent and Trademark Office on August 25, 2004. As set forth in the corresponding Interview Summary, of record, the interview involved presentation to the examiners of proposed claim amendments for overcoming the section 112, paragraph two, rejection of record and, further, discussion with respect to the inherent disclosure allegedly found in the cited references relied on to reject the claims as set forth in the current Office Action.

Claims 18-22, presented hereby, are pending.

Claims 13-17 are canceled, hereby, without prejudice or disclaimer.

Present claims 18-21 correspond to claims 13, 14, 16, and 17, respectively. Accordingly, as in the cancelled claims, the present claims recite "substantially" instead of "approximately," which had been used in previous claims, and the present claims do not contain the phrase "or larger than," which had been used in previous claims.

Moreover, as present claim 18 corresponds to claim 13, it combines 8, 10, and 11 and, so, limits the metal of claim 8 to a zinc and/or zinc alloy (as recited in claim 10) and to particles having a bulk density less than 2.8 g/ml (as recited in claim 11) and it is limited, further, to include elongated or elongated-flat particles of zinc and/or zinc alloy among the particles in the "mixture," as described in the subject application (page 4, last incomplete ¶). Claim 19 corresponds to claim 14 – i.e., it corresponds to claim 9 rewritten to be dependent on present claim 18. As present

claim 20 corresponds to claim 16, it corresponds to claim 12 rewritten in independent form and includes the changes to claim 8 found in new claim 18. As present claim 21 corresponds to claim 17, it contains the subject matter of claim 15 but, instead of the "excess" being "sucked off," the "excess is taken up by a separator and cathode," as described in the subject application (page 4, at the end of paragraph 3).

Present claim 22 combines 8, 10, and 11 and, so, limits the metal of claim 8 to a zinc and/or zinc alloy (as recited in claim 10) and to particles having a bulk density less than 2.8 g/ml (as recited in claim 11). In other words, claim 22 is the same as claim 13, except that claim 22 does not recite the limitation "the particles include elongated particles or elongated-flat particles."

Claim 12 was found allowable by the examiner if rewritten in independent form, as set forth in the final Office Action. Since present claim 20 contains all the limitations of claim 12, written as an independent claim, claim 22 is allowable, pursuant to the examiner's finding.

Present claim 21 is the same as claim 20, except that claim 21 removes excess electrolytic medium by having it "taken up by a separator and cathode," as explained above. Accordingly, claim 21 appears to be allowable, i.e, for the same reasons that claim 20 is allowable.

Claim 8 was rejected under 35 USC 112, second paragraph, for allegedly being indefinite. Reconsideration is requested in view of the changes to the claims effected, hereby.

The present claims replace each occurrence of "approximately" with "substantially." The phrase "or larger than" is deleted from the claims, hereby. From the aforesaid interview, applicant understands that these changes to the claims overcome the §112, ¶2, rejection.

Claims 8-10 were rejected under 35 USC 102(b) as allegedly being anticipated by each of JP 50-032437 (Hitachi) and US 4,172,294 (Warszawski). Claims 8-11 were rejected under 35 USC 103(a) as being allegedly unpatentable based on the combined teachings of Hitachi and JP 04-284,357 (Tada). Claims 8-11 were rejected under 35 USC 103(a) as being allegedly unpatentable based on the combined teachings of Warszawski and JP 10-032,022 (Yasumura).

Reconsideration of the aforesaid rejections of claims 8-11 under 35 USC 102(b) and 35 USC 103(a) is requested in view of the claims presented, hereby, as explained in the following remarks (which are substantially the same remarks previously submitted, repeated here for the examiner's convenience.

By way of review, a brief explanation of the presently claimed invention, as disclosed in the subject application, is provided in order to facilitate comparison with, and show patentable distinction from, the prior art relied on to reject the claims.

Applicant had sought to improve the mixture of metal (zinc or zinc alloy) particles and liquid electrolytic medium used in batteries and accumulators and, so, optimize their performance, durability, and resistance to heavy discharges and mechanical shocks. Applicant's objective was to maintain maximum particle-to-particle contact in the mixture by using the minimum amount of medium needed to dissolve the particles and, so, produce current. The particles in the mixture need to be in contact with one another so that current can pass from one to another. If the particles are not in immediate contact with one another, there is no electrical conductivity between them and, so, internal resistance of the battery increases with corresponding performance loss. Applicant's

improvement provides the mixture with only enough liquid electrolytic medium to fill the free space in a dry packing of the metal particles, such that the total volume of the mixture is substantially equal of the volume of the dry packing.

However, applicant was faced with the problem of *how* to obtain the improved mixture, i.e., the mixture as found in the final battery product. The improved mixture, itself, lacks sufficient fluidity for easy handling and filling up batteries. Applicant solved the problem by, first, preparing a *dosable mixture* – a sort of pre-mix – by combining the metal particles with an amount of liquid electrolytic medium *in excess of* the amount needed to fill the space in a dry packing of the metal particles. After the *dosable mixture* is filled into the battery, applicant found the "excess" medium readily removable by, e.g., applying a vacuum and, thereby, sucking it off.

None of the references relied on to reject the claims, taken alone or in combination, teaches or suggests either the presently claimed "mixture" or the presently claimed "process" by which the claimed mixture can be obtained.

Each of the rejections of record under section 102(b) and section 103(a) relies on *inherent teachings* allegedly found in each of Hitachi and Warszawski. However, none of the statements of rejection satisfies the standards necessary to support an allegation of inherency in an analysis under §102(b) or §103(a).

For the doctrine of inherency to apply it must be "*inevitable*" from the teachings of the prior art. *In re Wilding*, 190 USPQ 59, 62 (CCPA 1976) (*emphasis added*). "In relying on a theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably

support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (*emphasis in original*). Before "the burden shifts," the examiner has "the initial burden of establishing a prima facie basis for the alleged inherency." 17 USPQ2d at 1463-64. To base a rejection on what is allegedly inherent in the reference teachings,

the examiner must . . . reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the applied prior art.

17 USPQ2d at 1464 (*emphasis in original*). An argument by the PTO is "not prior art." *In re Rijckaert*, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). When the

PTO asserts that there is an explicit or implicit teaching or suggestion in the prior art, it must indicate where such a teaching or suggestion appears *in the reference*. ... The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient to establish inherency. ... [S]uch a retrospective view of inherency is not a substitute for some teaching or suggestion supporting an obviousness rejection.

28 USPQ2d at 1957 (*emphasis added*). A "retrospective view of inherency is not a substitute for some teaching or suggestion which supports the selection and use of the various elements in the particular claimed combination." *In re Newell*, 13 USPQ 2d 1248, 1250 (Fed. Cir. 1989).

According to the rejections under §102(b) and §103(a) based on Hitachi, according to the statement of rejection (Office Action, page 4):

Hitachi does not disclose the specific volume of the liquid electrolyte in the paste, but the Hitachi's [*sic*] paste for the battery would inherently meet the limitation of "the volume of the electrolytic medium approximately corresponds to the spaces between the particles in the dry packing" and [the

limitation] "the volume of the mixture [i]s equal to or larger than the volume of the dry packing of metal and/or alloy particles" and [the limitation] "[said] mixture exhibits a direct contact between almost all particles" in claims 8 and 10. The addition of a gelling agent to the electrolytic medium in claim-9 would be anticipatory.

The statements of rejection provide neither evidence nor scientific reasoning to support the finding of limitation on the rejected claims being *inherently* present in Hitachi.

While relying on the theory of inherency, the PTO has failed to "provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art" and, so, fails to satisfy "the initial burden of establishing a *prima facie* basis for the alleged inherency." *Levy*, 17 USPQ2d at 1463-1464.

Instead of the requisite scientific evidence or reasoning, the PTO relies on *argument*, alone, as to what is allegedly inherent in Hitachi. In relying solely on argument, the PTO has failed to "indicate where such a teaching or suggestion appears in the reference," which renders the rejections of the claims based on Hitachi untenable. *Rijckaert*, 29 USPQ2d at 1957. The PTO has failed to indicate, precisely, where and how there is any teaching in Hitachi that establishes (1) "the volume of the electrolytic medium approximately corresponds to the spaces between the particles in the dry packing" in Hitachi, (2) "the volume of the mixture is equal to or larger than the volume of the dry packing of metal and/or alloy particles" in Hitachi, (3) "said mixture exhibits a direct contact between almost all particles" in Hitachi, and (4) "said electrolytic medium contains a gelling agent" in Hitachi. Since the PTO has failed to show that Hitachi teaches or suggests any of these four

limitations on the rejected claims, anticipation under §102(b) is negated, [citation] and the finding of obviousness under §103(a) is invalid on its face. [citation]. With respect to the rejections based on Warszawski, the statement of rejection (Office Action, page 5), Warszawski's "use of a gelling agent would further inherently make the electrolyte volume to the inter-particle volume" limitation of the rejected claims. As with the rejections of record based on Hitachi (as explained above), the PTO fails to explain how the teaching of a gelling agent in Warszawski would inherently meet the limitation to "the volume of the mixture is equal to or larger than the volume of a dry packing of the metal and/or alloy particles" on the rejected claims, rendering their rejections under §102(b) and §103(a) untenable. [citations].

Additionally, to demonstrate patentability of the rejected (and present) claims over the cited prior art, Applicant submits, herewith, an English language abstract of a Japanese patent application – JP10162869 – of Toshiba Battery Co. LTD (Appendix I, *infra*) and a calculation of the volume of the electrolytic medium in batteries, that is, in non-amalgamated air cells, according to the cited JP10162869 (Appendix II, *infra*). JP10162869 was cited in a corresponding application before the EPO, because it teaches a material having a bulk density of 2.6-3.1 g/ml. However, as explained to the European examiner (in view of Appendix II calculation), this bulk density is not a bulk density of zinc powder, but the bulk density of the negative electrode active material. In other words, it is the bulk density of the mixture of zinc powder in the liquid electrolytic medium. This same explanation is applicable in comparing the rejected (and present) claims with the references relied on in the rejections of record.

In none of the examples set forth in the calculation does the volume of the electrolytic medium correspond to the spaces between the zinc particles in a dry packing. When the amount of electrolytic medium is 20%, it does not completely fill the spaces between the particles in a dry packing. On the other hand, when the amount of electrolytic medium is 40% or more, there is insufficient space between the particles in a dry packing to hold all of the electrolytic medium. In the latter case, the excess electrolytic medium must be fixed (i.e., solidified) with a gelling agent.

The data provided in the calculation clearly show that JP10162869 does not meet a salient feature of the present claims, i.e., the volume of the electrolytic medium must *correspond* to the spaces (i.e., volume) between the zinc particles in a dry packing. The same is true with respect to the prior art relied on to reject the claims in the present Office Action.

The data provided in the calculation clearly show that none of the cited references – taken alone or in combination – teaches or suggests a salient feature of the presently claimed invention. As recited in the present claims, (1) the volume of the electrolytic medium substantially corresponds to the spaces (i.e., volume) between the particles in the dry packing and (2) the volume of the mixture is equal to the volume of a dry packing of the (zinc and/or zinc alloy) particles.

The presently claimed mixture does not contain any *air*, on the one hand, yet it does not contain any *excess liquid medium* – i.e., more liquid medium than necessary to effect a *mixture volume* substantially equal to the *particle-dry-packing volume* – on the other.

Moreover, none of the cited references teaches or suggests how to obtain the presently claimed invention, which was a problem faced, and solved, by applicant. A "patentable invention

may be in the discovery of the source of the problem even though the remedy may be obvious once the problem is solved." *In re Sponnoble*, 160 USPQ 237, 243 (CCPA 1969). Only if there is excess liquid medium in the dosable mixture, to begin with, can the dosable mixture be sufficiently fluid – behaving as a paste or a viscous liquid – and be easily handled and filled into a battery. In accordance with the presently claimed process, a dosable mixture containing an "excess" of electrolytic medium is prepared, first, the dosable mixture filled in, e.g., a battery, and then the "excess" is removed, e.g., by sucking it off or taking it up by use of a separator and cathode. This is neither taught nor suggested by the prior art relied on to reject the claims. To support a rejection for anticipation under §102, the reference must be *enabling* as well as simply describe the claimed invention. *In re Le Grice*, 133 USPQ 365, 373-74 (CCPA 1962). To reject claims for obviousness under §103 based on modifying the teachings of a reference, existence in the prior art of a reason (motivation) to effect the modification is not, by itself, sufficient to sustain the initial burden on the PTO; the "record" must show

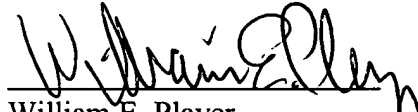
that it would also have been obvious *how* this [modification] could be achieved Obviousness . . . must not be judged by hindsight, and a "little modification" can be a most unobvious one.

In re Irani, 166 USPQ 24, 27 (CCPA 1970) (*emphasis in original*). Prior art relied on in a rejection under §103 must be *enabling*, i.e., "if the prior art of record fails to disclose or render obvious a method of making the claimed [invention] . . . it may not be legally concluded that the compound was in the possession of the public. *In re Hoeksema*, 158 USPQ 596, 601 (CCPA 1968).

Favorable action is requested.

Respectfully submitted,

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Patent Abstracts of Japan

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PUBLICATION NUMBER : 10162869
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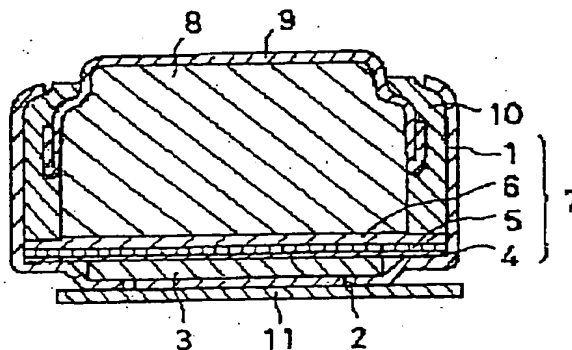
APPLICATION DATE : 02-12-96
APPLICATION NUMBER : 08321293

APPLICANT : TOSHIBA BATTERY CO LTD;

INVENTOR : OGATA HIDEYUKI;

INT.CL. : H01M 12/06 H01M 4/06 H01M 4/42

TITLE : NONAMALGAMATED AIR CELL



ABSTRACT : PROBLEM TO BE SOLVED: To provide a nonamalgamated air cell having excellent cell characteristics by improving flow performance of negative electrode active material and discharging utilization factor as nonamalgamation proceeds, and restricting deterioration of liquid leak resistance characteristics.

SOLUTION: A nonamalgamated air cell comprises a positive electrode case 1 having an air hole 2 in a bottom wall surface which is opened at one end, a positive electrode assembly 7 comprising a water repellent film 4, a catalyst layer 5, and a separator 6 laminated with each other, a gel negative electrode active material layer 8 including electrolyte and nonamalgamated zinc powder disposed to face the separator 6, and an insulation gasket 10 disposed to be inserted between sealed parts of the negative electrode case 9 and the positive electrode case 1. The nonamalgamated zinc powder in the negative electrode active material 8 is that having a bulk density of 2.6-3.1g/ml, and an electrolyte ratio of 20-100%, that having a bulk density of 3.1-3.5g/ml, and an electrolyte ratio of 60-100%, or that having a bulk density of 3.5-3.8g/ml, and an electrolyte ratio of 80-100%, thereby deterioration of flow performance, a discharging utilization factor, and leak resistance characteristics in charging the negative electrode active material 8 can be restricted to provide a nonamalgamated air cell having excellent cell performance.

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Calculation of the necessary space for the electrolyte in batteries according to
JP Publ. 10162869/Toshiba

Bulk density of zinc weight electrolyte volume zinc/ml volume electrolyte

(g/ml):	(20 weight %)	(1:7 ml per ml)	(1:1,37 ml per ml)
2,61	0,522	0,3729	0,3810
space in ml mixture for electrolyte		0,6271	too much
3.09	0.618	0.4414	0.3810
space in ml mixture for electrolyte		0.5586	too much

	(40 weight %)		
2,61	1,044	0,3729	0,7620
space in ml mixture for electrolyte		0,6271	too little
3.09	1,236	0,4414	0.9022
space in ml mixture for electrolyte		0,5586	too little

	(60 weight %)		
2,61	1,566	0,3729	1.1430
space in ml mixture for electrolyte		0,6271	too little
3,09	1,854	0,4414	1,3533
space in ml mixture for electrolyte		0,5586	too little
3,51	2,106	0,5014	1,5372
space in ml mixture for electrolyte		0,4986	too little

From the above figures can be seen, that non the examples fulfills the parameter that the volume of electrolytic medium is equal the volume of the dry packing of the zinc and/or zinc alloy particle.

Using 20 weight % electrolyte remains much space for air. By using 40 weight % or more electrolyte is not sufficient space between the particle. Therefore this excess has to be fixed by a gelling agent.

APPENDIX II